



Serial No. 10/763,714
60130-1495; 02MRA0344

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Chien
Serial No.: 10/763,714
Filed: January 23, 2004
Examiner: Kramer, Devon C.
Group Art Unit: 3683
Title: INBOARD BRAKING TRAILER WHEEL END ASSEMBLY

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P.O. Box 1450
Alexandria, VA 22313-1450

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APPEAL BRIEF

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Dear Sir:

Appellant submits this Appeal Brief pursuant to the Notice of Appeal filed June 29, 2005. Enclosed is a check for the appeal brief fee. If any additional fees or credits are required they may be charged or applied to Deposit Account No. 50-1482 in the name of Carlson, Gaskey & Olds.

I. REAL PARTY IN INTEREST

The real party in interest is ArvinMeritor Technology, LLC, assignee of the present invention.

II. RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences or judicial proceedings related to this appeal, of which may directly affect or may be directly affected by, or have a bearing on, the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1,4, 6-8, 11-15 and 17-24 are pending and have been rejected.

IV. STATUS OF AMENDMENTS

Amendments to claims 14, 15, 17, 18 and 20 that were submitted in a request for consideration were not entered. These amendments were submitted to correct minor informalities with each of the claims.

V. SUMMARY OF CLAIMED SUBJECT MATTER

This invention generally relates to a trailer wheel assembly including an inboard brake. Commercial vehicle trailer axles comprise an axle hung from a trailing arm on either side of the trailer chassis and supported by a suspension member such as a leaf spring or air spring assembly. A brake assembly is mounted to each wheel inside an inner circumference of the wheel. The brake assembly is mounted such that the wheel hub rotates around the brake assembly disposed within the inner circumference of the wheel rim. The inner circumference of the wheel rim is a constraint on the configuration of the brake assembly. A further limitation on

the brake assembly is the need for replacement of worn brake components such as brake pads or the brake rotor. Replacement of worn brake pads or brake rotors requires removal of the road wheel from the vehicle. Limits on the configuration of the brake assembly translate into limitations on the overall braking capacity of the brake assembly.

The present invention is a wheel end assembly 10 including a brake assembly mounted inboard of a wheel rim 12 and hub 28. The wheel end assembly 10 includes an axle shaft 20 mounted for rotation within an axle housing 18. The axle shaft 20 includes the hub 28 mounted to a first end for mounting a wheel. A rotor 40 is fixed to a second end of the axle shaft 20 and cooperates with a brake caliper assembly 42 for braking the wheel. (Paragraph 12 and 13 and Figure 1).

The caliper assembly 42 is mounted to the housing 18 and the housing 18 is mounted to a suspension member 16 of the trailer. The rotor 40 is mounted to the axle shaft 20 at a point inboard of any portion of the wheel rim. (Figure 1 and Paragraphs 5,14 and 15).

Independent claim 1 requires an axle shaft 20 having a first end 30 and a second end 32. The axle shaft 20 is required to be mounted for rotation within a housing 18 where the first end 30 and the second end 32 extend outside of the housing 18. A hub 28 is fixed to the first end 30 of the axle shaft 20 and a brake assembly 42,46 including a rotor 40 is disposed outside of the housing 18 within which the axle shaft 20 rotates. The rotor 40 is attached to the axle shaft 20 adjacent the second end 32, and the second end 32 is spaced apart from the hub 28 a first length 59 greater than an axial length of the housing 20 (Paragraphs 12,13, 14, Figure 1).

Independent claim 13 is directed toward a brake assembly 42,46 including an axle shaft 20 supported for rotation within an axle housing 18. The axle shaft 20 includes a first end 30 and a second end 32. A hub 28 is fixed to the first end 30 of the axle shaft 20 and a rotor 40 is fixed adjacent the second end 32 of the axle shaft 20 outside of the axle housing 18. A first brake pad 44 and a second brake pad 44 are supported within a caliper 42 mounted to the axle housing 18 and are selectively engageable with the rotor 40 (Paragraphs 12-14, Figure 1).

Independent claim 19 requires a housing 18 having an axial length and an axle 20 supported for rotation within the housing 18. The axle 20 is required to include a first end portion 30 and a second end portion 32 both extending outwardly from the housing 18. The second end portion 32 is spaced apart from the first end portion 30 a length greater than the axial length of the housing 18. A wheel hub 28 is attached to the first end portion 30 of the axle 20 and a rotatable brake member 40 attached to the second end portion 32. Further required by claim 19 is an actuator 46 for selectively moving friction members 44 into engagement with the rotatable brake member 40. (Paragraphs 12-14, Figure 1).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(1) Claims 1, 4, 6, 13-14, 19-21 and 23-24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Swiss Patent No. 663387 to Attinger ("Attinger").

(2) Claim 7 stands rejected under 35 U.S.C. § 103(a) as being obvious over Swiss Patent No. 663387 to Attinger as modified in view of U.S. Patent 4,583,609 to Anderson et al. (“Anderson”).

(3) Claims 8,15, and 17 stand rejected under 35 U.S.C. § 103(a) as being obvious over Swiss Patent No. 663387 to Attinger as modified in view of U.S. Patent Application 20020028721 to Inoue et al. (“Inoue”)

(4) Claims 11-12,18 and 22 stand rejected under 35 U.S.C. § 103(a) as being obvious over Swiss Patent No. 663387 to Attinger as modified in view of U.S. Patent Application 20030136613 to Seki.

VII. ARGUMENT

(1) Rejection of claims 1, 4, 6, 13-14, 19-21 and 23-24 as anticipated by Attinger

The Attinger reference is entirely in German and does not have an English equivalent. It is difficult from the drawings to determine exactly how the system works. The English abstract supplied by the examiner is insufficient to fully support examiners interpretation of the Attinger device, especially in view of the examiner’s interpretations in support of the anticipation rejections under 35 U.S.C. 102(b). See Ex parte Gavin, 62 USPQ2d 1680 (U.S. Patent and Trademark Office Board of Patent Appeals and Interferences, 2001). Appellant had previously requested that the examiner obtain a translation as such a translation may have enabled the

examiner to clearly understand the teachings of Attinger. (“ . . . obtaining translations is the responsibility of the examiner. A review by the examiner and applicant of translations of the prior art relied upon in support of the examiner’s rejection may supply additional relevant evidence on issues of anticipation and obviousness . . . and may eliminate the need for an appeal.”). Id. at 1684.

Claims 1, 4 and 6

Claim 1, requires an axle shaft mounted for rotation within a housing, and a rotor disposed outside the housing and attached to the axle shaft. The Examiner argues that these features are disclosed by Attinger. The Examiner is reading the Attinger reference incorrectly and contrary to how a worker skilled in the art would understand the Attinger reference.

The examiner argues that Attinger discloses an axle shaft (3) mounted within a housing (7), the housing being defined as “the portion of the brake disc (11) to the wheel.” (Final office action Mailed 12/30/2004, page 2, item 3). The examiner further argues that “ housings (7,9) are hollow shafts through which an axle shaft rotates. (Advisory action Mailed 3/09/2005, Item 11).

Attinger discloses a hollow shaft (7) that extends between a coupling (8) and gearbox (5). There is no portion of the axle shaft (3) that rotates within the hollow shaft (7). Further, no translated portion of the specification states that the axle shaft (3) rotates within the hollow shafts (7,9) as is stated by the examiner in the Advisory Action (Please see item 11 in the Advisory action mailed 3/9, 2005). The hollow shaft (7) is the rotating member. The English abstract says that the brake disc (11) is fixed to the hollow shaft (7). The hollow shafts (7,9) are coupled to the axle shafts (3) with couplings (8,10). Axle shaft (3) is not mounted within any type of

housing. The Attinger components indicated by reference numerals 3,10,9,7 and 8 are all rotating components.

The examiner is improperly interpreting the term “through” in the title and abstract to come to this reading. “Through” does not mean within. “Through” means “with” or “by”; a fact clearly supported by the English abstract. Attinger discloses a gearbox (5) that drives hollow shafts (7,9). The hollow shafts (7,9) are coupled to shafts (3) with shaft couplings (8,10). The examiner is reading the word “through” improperly. In the context of this description “through” means that drive torque is transmitted through the shafts (7,9) and couplings (8,10) to the axle shaft (3), not that the axle shaft (3) rotates within an inner space provided by the hollow shafts (7,9).

The remainder of the description provided in Attinger supports the definition of “through” meaning transmitting torque. Couplings (8 and 10) connect the axle shaft (3) with the hollow shafts (7 and 9). If the axle shaft (3) rotated within the hollow shafts (7 and 9) as read by the Examiner, why would there be a need for the couplings (8,10)? Further, if the axle shaft (3) was driven directly by the gearbox (5), why is there a need for a hollow shaft (9) on a side opposite the gearbox (5) that does not include a brake rotor (11)? It is for these reasons, that the examiner’s interpretation of Attinger is not reasonable. Attinger clearly does not disclose an axle shaft rotating within a housing and therefore does not anticipate the limitation of an axle shaft mounted for rotation within a housing as is required by claim 1.

The Examiner is reading that portion of hollow shaft (7) to the left of the brake disc (11) as the axle shaft, and that portion to the right of the brake disc (11) as the housing. It is true that

the hollow shaft (7) is an axle shaft that transmits torque from the gearbox to the coupling (8) and onto the axle shaft (3). However, such a reading does not meet the limitations of claim 1 requiring the axle shaft to be mounted for rotation within a housing.

Additionally, claim 1 requires that a rotor be attached to the axle shaft and disposed outside of the housing. It is unclear how the Examiner is reading this limitation in Attinger. If, as read by the Examiner, the axle shaft is that portion of the hollow shaft (7) between the rotor (11) and the gearbox (5), (Advisory Action Mailed 3/9/2005, item 11) then, the examiner's reading that the axle shaft rotates within the hollow shafts (7 and 9) (Advisory action, item 11) does not make sense.

Contrary to the examiner's reading, Attinger does not disclose a rotor or brake member attached to an axle shaft. The brake disc (11) in Attinger is fixed to the hollow shaft (7) which the examiner argues corresponds to the claimed housing. Under the examiner's interpretation the brake disc (11) is fixed to housing (7) with axle shaft (3) rotating within housing (7). It is clear that this interpretation of Attinger is incorrect. In fact, the purpose and stated advantage of Attinger is to provide a brake unit that is uninfluenced by movement of the axle shaft. Therefore, reading that the brake disc (11) in Attinger is mounted to the axle shaft is contrary to a stated purpose and is not supportable in the context of the remainder of the disclosures in Attinger.

Further, claim 1 requires that a rotor be attached to an axle shaft adjacent a second end. The disc (11) of Attinger is not disposed adjacent any end of any shaft. In fact, the disc (11) in Attinger is attached at a midpoint between ends of the hollow shaft (7). The reading by the

examiner is not proper and is not what a worker skilled in the art would understand the limitation *“attached to the axle shaft adjacent the second end”* to require.

In the Advisory Action, the examiner argues that Applicant never defines the location of the second end of the axle shaft. Appellant disagrees. Claim 1 recited a hub at a first end and a rotor at the second end wherein the second end is spaced apart from the hub a first length greater than an axial length of the housing. The examiner argues that housing (7) extends from brake disc (11) to the wheel, but it is clear that hollow shaft (7) extends only between coupling (8) and gearbox (5) with brake disc (11) being mounted to a center portion of the hollow shaft (7). This cant possibly meet the requirement that the second end is spaced apart from the hub a first length greater than and axial length of the housing recited in claim 1.

Claims 13-14

Claim 13 requires an axle shaft supported for rotation within an axle housing and a rotor fixed to an end of the axle shaft and outside of the housing. The examiner is reading the portion of the hollow shaft (7) between the disc (11) and the gearbox (5) as the axle shaft and that portion of hollow shaft (7) between the disc (11) and the wheel as the housing. The examiner’s reading of Attinger is not supported by the disclosure and is not what a worker skilled in the art would understand the disclosure to convey. Even if the examiner’s reading is assumed correct for the sake of argument, Attinger still does not anticipate all the limitation required by claim 13.

Claim 13 requires that the axle shaft be supported for rotation within the axle housing. Attinger does not disclose an axle shaft rotating within a housing. The examiner’s reading does

not meet this limitation as it would require that portions of the hollow shaft (7) rotate within itself.

Accordingly, for these reasons, along with the reasons discussed with regard to claim 1, Attinger does not anticipate claim 13. For the reasons set forth above, Attinger does not disclose an axle shaft that rotates within a housing. Shaft (3) in Attinger clearly does not rotate within hollow shaft (7). Further, claim 13, requires the caliper to be mounted to the axle housing. The examiner interprets the hollow shaft (7) as the claimed housing. Caliper (14) in Attinger is mounted to console (15), which is fixed to gear box (5). Under the examiner's interpretation the caliper would be mounted to the same rotating component as the brake disc (11), i.e. hollow shaft (7). The caliper (14) is a non-rotating component and cannot be mounted to a rotary component as such a configuration would be inoperable.

Claims 19-21, 23, and 24

Claim 19 requires an axle supported for rotation within a housing and a rotatable brake member attached to a second end portion of the axle. Further, claim 19 requires the shaft supported within the housing to have a first end portion and second end portion extending outwardly from the housing, and that the second end portion be spaced apart from the first end portion a length greater than an axial length of the housing.

Attinger, discloses a rail brake assembly that transmits torque from a gearbox (5) to hollow shafts (7 and 9) and couplings (8 and 10). Attached to the couplings (8 and 10) are axle shafts (3). The hollow shaft (7) includes a disc (11) attached to an outer surface. The examiner is reading that portion of the hollow shaft (7) between the gearbox (5) and the disc (11) as the

axle shaft and that portion of the hollow shaft (7) between the disc (11) and the wheel end as the housing. This interpretation by the examiner does not disclose a shaft having a second end portion spaced apart from the first end by a length greater than an axial length of the housing. Further, the examiner's interpretation of Attinger is not reasonable for the reasons discussed with regard to claims 1 and 13.

Attinger does not disclose an axle shaft rotating within a housing. In Attinger, the axle shaft (3) is attached to a coupling on a first end and to a wheel on a second end. Further, even accepting the Examiner's reading, *arguendo*, of a housing being that portion of the hollow shaft (7) between the wheel (2) and the disc (11) and the axle shaft that portion of the hollow shaft (7) between the disc (11) and the gearbox (5) all the limitations are still not met.

Claim 19 requires that the axle shaft (read by the examiner as that portion of hollow shaft (7) to the right of the disc (11) shown in Figure 1 of Attinger) be supported for rotation within the housing (read by the examiner as that portion of the hollow shaft (7) to the left of the rotor (11)). There is simply no disclosure in Attinger that discloses or suggests this limitation, nor does such a reading make sense. How can a hollow shaft be supported for rotation within itself?

For this reason along with the reasons discussed with regard to claim 1, claim 19 is not anticipated by Attinger. Accordingly, the rejection to claims 1, 4, 6, 13-14, 19-21 and 23-24 should be reversed.

(2) Rejection of claim 7 under 35 U.S.C. § 103(a) as being obvious over Attinger as modified in view of Anderson et al.

Claim 7 depends ultimately from claim 1 and includes the additional limitation that the actuator is hydraulically actuated. Claim 1 requires an axle shaft having a first end and a second end mounted within a housing and that the first end and the second end extend outside of the housing. For the reasons discussed above Attinger does not suggest or teach this limitation, and therefore the modification of Attinger in view of Anderson et al. (hereafter “Anderson”) does not disclose or suggest all the limitations of claims 1 and 7.

Further, when it is necessary to select elements from different references in order to form the claimed invention, there must be some suggestion or motivation to make the selection. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. The extent to which such suggestion must be explicit in, or referred from, the references, is decided on the facts of each application in light of the prior art and its relationship to the claimed invention. It is impermissible to engage in a hindsight reconstruction of the claimed invention, using appellant’s structure as a template and selecting elements from the references to fill the gaps. The references themselves must provide some teaching whereby appellant’s combination would have been obvious. In re Gorman, 933 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991).

The proposed modification of Attinger with the brake system disclosed in Anderson is not supported by any suggestion or motivation. Simply because Anderson disclose a hydraulic

brake assembly does not suggest the desirability to make the proposed modification. Anderson discloses a drive and brake assembly for an aircraft belt loader with a purpose to provide a level frame that is below a centerline of wheels supporting the loader (Anderson, Col 1, lines 8-15). Further, Anderson states that an advantage of the brake system is to reduce space required in an inboard and outboard direction (Anderson Col 2, lines 23-25). The reduction in space is necessary in Anderson to add clearance for links and cylinders associated with the belt loader. The Attinger rail brake has no such constraints and has as a purpose the isolation of movement of an axle shaft (3) from a brake member. Accordingly, the reduced space brake assembly of Anderson would provide no benefit to the Attinger rail brake. Without some benefit, there can be no suggestion or motivation, and thereby no *prima facie* case of obviousness.

For these reasons, along with the reasons discussed above with regard to claim 1, the rejection of claim 7 is improper and should be reversed.

(3) Rejection of claims 8,15, and 17 under 35 U.S.C. § 103(a) as being obvious over Attinger as modified in view of Inoue et al.

Claims 8 and 15 require bearing assemblies for supporting the axle shaft for rotation within the housing. Claim 17 requires a seal between the housing and the axle shaft. For the reasons set forth above, Attinger does not disclose, suggest or teach features of claims 1 and 13. Combining Attinger with Inoue does not make up for the deficiencies of Attinger.

Further, there is no motivation or suggestion to modify Attinger with Inoue et al. as proposed by the examiner because there is no benefit. Attinger discloses a rail brake system

having a gearbox (5) that drives hollow shafts (7 and 9) that in turn drive couplings (8 and 10) that finally drive axle shafts (3). There is no shaft that rotates within a housing and therefore no benefit to providing bearings or seals for supporting rotation of an axle within a housing. Without some benefit to the proposed combination there can be no suggestion or motivation, and therefore no *prima facie* case of obviousness. Accordingly, the rejection of is improper and should be reversed.

(4) Rejection of claims 11-12,18 and 22 under 35 U.S.C. § 103(a) as being obvious Attinger as modified in view of Seki.

Claims 11, 12,18 and 22 ultimately depend from an allowable base claim (Claim 1, 13, 19) and therefore are also in allowable form. The proposed modification of Attinger in view of Seki fails to disclose or suggest the limitations of claims 1, 13, and 19 because Attinger does not disclose all the limitations required in claims 1, 13 and 19 as discussed in detail above.

Claim 11 requires the housing to be mountable to a suspension arm. Claim 12 depends from claim 12 and requires that the suspension arm is pivotally mountable to a frame of a motor vehicle. Claim 18 requires that the axle housing be mountable to a trailing arm, and that the trailing arm is pivotally mountable to a frame member on a first end and a supported by a suspension member on a second end. Claim 22 also requires that the housing be supported on a trailing arm that is pivotally attachable to a vehicle frame member.

The proposed modification of Attinger in view of Seki is not proper as there is no suggestion or motivation to make the proposed combination. Attinger provides a drive for a rail

car and provides the hollow shaft (7) that is isolated from movement of the axle shaft (3) to improve braking. Seki discloses a suspension for an all terrain vehicle. There must be more than a random assembly of parts from different references to support a proposed modification. In the proposed modification, there is nothing in Attinger that would suggest a housing connected to a suspension arm, because in Attinger there is no housing disclosed, only the arrangement of transferring torque through a hollow shaft (7) to a coupling (8) and finally to the axle shaft (3) and therefore no benefit to making the proposed combination. Without some benefit there can be no suggestion or motivation, and therefore no *prima facie* case of obviousness

Further, Attinger discloses a brake for a rail car that operates on uniform track with small grades and wide turns. This operation is very different than a suspension system for an all terrain vehicle designed to accommodate uneven terrain. The housing as interpreted by the examiner is a rotating shaft that cannot be mounted to a suspension component. For this reason the proposed combination cannot disclose all the limitations required in the claims. Further, such a suspension system would provide no benefit to Attinger. As there is no benefit, the proposed modification cannot be supported by any motivation or suggestion.

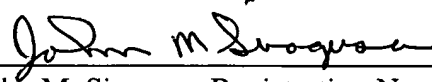
For these reasons claims 11, 12, 18, and 22 are allowable and the rejection should be reversed.

CONCLUSION

For the reasons set forth above, the rejection of all claims is improper and should be reversed. Appellant earnestly requests such an action.

Respectfully submitted,

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Dated: August 29, 2005

CERTIFICATE OF MAIL

I hereby certify that the enclosed Appeal Brief is being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to Mail Stop – Appeal Brief, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 29th day of August 2005.


Amy M. Spaulding

VIII. CLAIMS APPENDIX

1. (PREVIOUSLY PRESENTED) An axle assembly for a vehicle comprising:
an axle shaft having a first end and a second end, said axle shaft mounted for rotation within a housing, said first end and said second end extending outside of said housing;
a hub fixed to said first end of said axle shaft; and
a brake assembly including a rotor disposed outside of said housing and attached to said axle shaft adjacent said second end, wherein said second end is spaced apart from said hub a first length greater than an axial length of said housing.
- 2-3. (CANCELLED)
4. (PREVIOUSLY PRESENTED) The assembly of claim 1, wherein said brake assembly includes an actuator mounted to said housing for actuating a caliper for selectively engaging said rotor.
5. (CANCELLED)
6. (ORIGINAL) The assembly of claim 4, wherein said actuator is pneumatically operated.
7. (ORIGINAL) The assembly of claim 4, wherein said actuator is hydraulically actuated.
8. (PREVIOUSLY PRESENTED) The assembly of claim 1, including bearing assemblies disposed within said housing for supporting rotation of said axle shaft relative to said housing.
- 9-10. (CANCELLED)

11. (ORIGINAL) The assembly of claim 1, wherein said housing is mountable to a suspension arm.
12. (ORIGINAL) The assembly of claim 11, wherein said suspension arm is pivotally mountable to a frame of a motor vehicle.
13. (PREVIOUSLY PRESENTED) A brake assembly comprising:
 - an axle shaft supported for rotation within an axle housing, said axle shaft having a first end and a second end;
 - a hub fixed to said first end of said axle shaft;
 - a rotor fixed adjacent said second end of said axle shaft outside of said axle housing; and
 - a first brake pad and a second brake pad supported within a caliper mounted to said axle housing and selectively engagable with said rotor.
14. (PREVIOUSLY PRESENTED) The assembly of claim 13, further including a brake actuator for moving said brake pads into engagement with said rotor.
15. (PREVIOUSLY PRESENTED) The assembly of claim 13, including bearing assemblies disposed within said housing for supporting said axle shaft for rotation relative to said housing.
16. (CANCELLED)
17. (ORIGINAL) The assembly of claim 13, including seals disposed between said axle housing and said shaft.
18. (ORIGINAL) The assembly of claim 13, wherein said housing is mountable to a trailing arm pivotally attachable to a frame member on a first end and supported by a suspension member on a second end.

19. (PREVIOUSLY PRESENTED) A brake assembly comprising:
- a housing having an axial length;
 - an axle supported for rotation within said housing, said axle having a first end portion and a second end portion both extending outwardly from said housing, said second end portion spaced apart from said first end portion a length greater than said axial length of said housing;
 - a wheel hub attached to said first end portion of said axle;
 - a rotatable brake member attached to said second end portion; and
 - an actuator for selectively moving friction members into engagement with said rotatable brake member.
20. (PREVIOUSLY PRESENTED) The assembly as recited in claim 19 wherein said rotatable brake motor comprises a rotor.
21. (PREVIOUSLY PRESENTED) The assembly as recited in claim 20 wherein said actuator comprises a caliper for supporting movement of said friction members into engagement with said rotor.
22. (PREVIOUSLY PRESENTED) The assembly as recited in claim 19 wherein said housing is supported on a trailing arm, said trailing arm pivotally attachable to a vehicle frame member.
23. (PREVIOUSLY PRESENTED) The assembly as recited in claim 19, wherein said rotatable brake member is accessible without removal of a wheel mounted to said wheel hub.
24. (PREVIOUSLY PRESENTED) The assembly as recited in claim 19, wherein said axial length of said housing is greater than a length of a vehicle wheel rim measured along an axis of rotation.

IX Evidence Appendix

None

X Related Proceedings Appendix

None